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A N
INAUGURAL DISSERTATION
O N
O P I U M;
SUBMITTED TO THE EXAMINATION
O F T H E
REV. WILLIAM SMITH, S. T. P. PROVOST;
A N D T O T H E
TRUSTEES AND MEDICAL PROFESSORS
O F T H E
COLLEGE OF PHILADELPHIA;

FOR THE DEGREE OF
DOCTOR OF MEDICINE:
ON THE TWENTY-THIRD DAY OF JUNE, A. D. 1791.

B Y H A S T H A N D Y,
OF THE STATE OF MARYLAND.

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M D C C X C I.



For Doctor Redman
with respectful compliments
from his Hum^l
S^{vt}. the
Author

T O

BENJAMIN RUSH, M. D.

PROFESSOR OF THE THEORY AND PRACTICE OF MEDICINE,

AND TO

BENJAMIN SMITH BARTON, M. D.

PROFESSOR OF BOTANY AND NATURAL HISTORY—*IN THE*
COLLEGE OF PHILADELPHIA:

A L S O,

T O

DOCTOR JOHN WOOLFORD,

OF SOMERSET COUNTY,

AND TO

PETER CHAILLÉ, Esquire,

OF WORCESTER COUNTY—*MARYLAND,*

THE FOLLOWING DISSERTATION

is Inscribed,

As a mark of the RESPECT—GRATITUDE—and AFFEC-
TION, of their sincere friend,

The Author.

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INTRODUCTION.

“IT requires,” to use the words of one of our professors, “the recollection of escapes from a lion and a bear,” to encounter the opinions which have been uniformly received on the subject of OPIUM. In this difficult enterprise, I have availed myself of facts only, which I flatter myself will be much more acceptable, in a discussion of this kind, than mere speculative assertions. If I have failed in elegance or taste in the language of my dissertation, I hope I shall be excused, inasmuch as I have suffered, in common with the youth of our country, in having been obliged to submit to that system of modern school-learning, which has, unfortunately, in a great degree, excluded the study of our native language from being a necessary part of education.

T H E

NATURAL HISTORY OF OPIUM.

THIS valuable drug is the production of the poppy, which grows, in great plenty, in Egypt, Persia, and the different provinces of Asia, where it is cultivated in large quantities; especially in Thebes in Egypt—hence it derives the name Thebaic Opium. It is laid, that, in the province of Bahar, in the East-Indies, the poppy-seeds are sown in October or November, at about eight inches distance, and are well watered till the plants are about half a foot high, when a compound of nitrous earth, dung, and ashes, is spread over the areas; and, a little before the flowers appear, they are again watered profusely, until the capsules are half grown, and then the opium is collected; for, when fully ripe, they yield but little juice. The method of obtaining it is, by making two incisions, in each unripe capsule, from below upwards, taking care not to penetrate the

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the internal cavity of the capsule. These incisions are made at sun-set, for three or four successive evenings, until each capsule has received six or eight wounds; they are then allowed to ripen their seeds. If the capsule were wounded in the heat of the day, a cicatrix would be too soon formed; on the contrary, night favours the distillation of the juice. Early in the morning, the juice is scraped off the wounds with an iron scoop, and worked in an earthen pot for a long time in the sun, until it becomes of a considerable spissitude. It is then made up into cakes generally of a globular form, of different sizes, from four ounces to a pound or upwards in weight, which are covered with leaves, or some other vegetable matter, to prevent their running or sticking together.

THE Abbe Raynal, in describing the cultivation of opium, in his History of the East-Indies, says, “ When the poppy is full of sap,
 “ and the head of it begins to swell, one or
 “ more incisions are made into it; from whence
 “ distil some drops of the milky liquor con-
 “ tained within, which are left to congeal, and
 “ are

“ are afterwards gathered. This operation is
 “ repeated three times ; but the produce gra-
 “ dually diminishes in quantity, nor is it of so
 “ good a quality. When the opium is ga-
 “ thered, it is moistened and kneaded with
 “ water, or honey, till it acquires the consist-
 “ ence, viscosity, and glossiness of pitch, when
 “ it is well prepared, and is then made into
 “ cakes. That kind is most esteemed which
 “ is rather soft and yields to the touch, is in-
 “ flammable, of a blackish brown colour, and
 “ has a strong fetid smell. On the contrary,
 “ that which is dry, friable, burnt, and mixed
 “ with earth and sand, is to be thrown away.”

OPIUM is a gummy resinous substance, and
 tenacious to the touch, especially after hand-
 ling it for some time. When pulverised, it is
 of a yellowish colour, but, in the mass, of a
 dark red. It has a strong peculiar smell ;
 bitterish taste, somewhat nauseous at first, af-
 terwards accompanied with a pungent heat
 and acrimony. In order to ascertain its visi-
 ble impurities, it should be sliced, by which
 operation many heterogeneous things are often
 seen

seen united with it. The best criterion of the goodness of opium, without a chemical analysis, is, that, when broken, it appears bright, is dry, not unctuous, but moderately compact and ponderous, of a dark reddish-brown colour, and tinctures water, when added to it, of a red colour.

I SHALL now enquire into the manner in which opium acts upon the human body.

THERE is no subject which has been the occasion of so much controversy as the *modus operandi* of opium. It appears to have been a question much agitated among the ancients, whether it acted primarily on the blood, by rarefying and increasing its volume, and afterwards produced its effects indirectly on the brain and nerves; or, whether its operation was directly on the nervous system? It has likewise been made a question, whether, on the exhibition of opium, the action of the heart be increased, and the pulse accelerated?—But, the prevailing opinion, for many centuries, has been, that it possesses a sedative operation;

ration; and one of the last writers of the present century, on the *Materia Medica*, has asserted, that it acts by diminishing mobility, and suspending, in a certain manner, the motion of the nervous fluid. He observes, that, in the narcotic substance, there is a stimulant, as well as a sedative, matter, which, instead of always diminishing the action of the heart, seems to be powerfully stimulant with respect to it. To explain this stimulant power, he says, it appears necessary to assign some other cause than the direct stimulating quality of the substance applied. With respect to the sedative operation of opium, his conclusions are evidently drawn from its inducing, under certain circumstances, that cessation of strength and motion which induces sleep. His words are, “ As we take it for
 “ granted, that all exercise of sense and vo-
 “ luntary motion depends upon the motion
 “ of the nervous fluid to and from the brain,
 “ we conclude, that sleep consists in a suspen-
 “ sion of these motions.” Hence, he infers that opium induces sleep, and removes pain,
 by

by fufpending the motion of the nervous fluid, through the medium of its fedative powers.

I SHALL now propofe my own opinion concerning the operation of opium. This I fhould do with great diffidence, were I not fupported in it by authorities of the higheft eminence in medicine.

IN order to afcertain the manner in which opium acts upon the fyftem, let us firft enquire into the ufual effects of fubftances which are univerfally acknowledged to be of a *ftimulating* nature, particularly fermented and fpirituuous liquors, upon a healthy body. Do they produce vigour of body, and chearfulnefs of mind?—So does opium. Do they excite paffion and emotion?—So does opium. Do they induce watchfulnefs, difsipate fadnefs, and infpire refolution?—So does opium. Do they, under certain circumftances, induce fleep?—So does opium. And do they, when taken in immoderate dofes, produce giddinefs, a rednefs of the face, fwelling of the lips, troublefome dreams, flarting, convulfion, a confiderable dilatation of
the

the pupils, imperfect speech, full pulse, quick breathing, nausea, vomiting, itching of the skin, madness, hiccup, syncope, death? I will appeal to every reflecting and candid physician, if an immoderate dose of *opium* does not produce the same effects. Why, then, may we not, with the same propriety, annex the term *stimulant* to opium as to any of those stimulating liquors?

DOCTOR Young relates a case of a surgeon, who always took a considerable dose of opium, previously to his performing an operation of any importance. Doctor Brown informs us of a gentleman who was anxious to accomplish a literary composition, which required an uninterrupted exertion of his mental faculties for more than forty-eight hours, who was enabled to perform it by supporting himself with stimuli. The last that he had recourse to was opium. This powerful antidote to sleep (under certain circumstances) conducted him to the conclusion of his work, with the same vigour and clearness of mind with which he had commenced it.

THERE

THERE is a passage in Chardin's Travels, which Dr. Leigh on Opium takes notice of, and which I beg leave to transcribe. " The
 " free use of opium among the Persians, ap-
 " pears to have been introduced to allay the
 " uneasiness and troubles of old men, in great
 " places, who were forbid the use of wine by
 " Mahomet. They have several preparations
 " of the poppy, which they use for that pur-
 " pose. The first is the juice of the poppy it-
 " self, which they use in form of a pill, of the
 " bigness of a pin's head at first, and then gra-
 " dually increase it to the size of a pea : in
 " one hour's time they begin to feel its effects.
 " The Persians say, it entertains their fancies
 " with pleasant visions, and a kind of rapture.
 " They very soon grow merry, then burst in-
 " to a laugh, which continues until they die
 " away in a swoon. It is found, by those who
 " have a disposition for jesting, to increase that
 " extremely. After the operation of this me-
 " dicine, the body grows cold, pensive, and
 " heavy. In this dull and indolent situation
 " it remains, till the dose is repeated. Those

“ of the Persians who are accustomed to use
 “ this remedy, cannot live without it: the
 “ want of it produces depression of spirits, and
 “ a languor and debility are instantly disco-
 “ vered in the countenance. The Turks say
 “ they cannot live without opium, unless wine
 “ is given them in its place; and, even then,
 “ they are not content, as they say the wine
 “ does not operate so powerfully on them as
 “ opium.” Doctor Mead, in speaking of the ef-
 fects of opium, says, it is as common a saying
 with the ‘Turks and Persians, “ He has eaten
 “ too much opium,” as, with us, “ He has drank
 “ too much wine.” It is used by the Chinese
 as an agreeable cordial, and is taken by them
 previously to all daring and arduous exploits.

THE experiments which were instituted by
 Doctor Leigh, with the view of ascertaining
 the effects of opium, must, to a mind fond of
 enquiry, afford much instruction, more parti-
 cularly the 30th and 31st of them; the first
 of which, the Doctor himself takes notice of
 —in the latter, we have the authority of the
 gentleman who made the experiment on him-
 self,

self, which fact he communicated to Doctor Leigh. The result of both experiments induces me to conclude, that *opium* is possessed of the most diffusible stimulus. For a more particular account, I shall refer my readers to the experiments themselves.

MANY other facts might be adduced, from authors, to prove that opium possesses stimulating powers in a healthy state of the body ; but, those which have been mentioned, I hope, will be sufficient for my purpose. But, if we examine the effects of opium in certain diseases, we shall find new proofs of its stimulating qualities. Do we not see it recommended, every day, in those of the greatest debility, and with great success, even by an espouser of its imaginary sedative qualities ? Dr. Cullen, in speaking of the cure of intermittent fevers, says, “ It appears to me clearly, that the recurrences of the paroxysm of
“ intermittent fevers, depend upon a recurrence of a state of debility, and that this is
“ to be prevented either by the use of tonics,
“ or stimulants, which may excite the action

“ of the heart and arteries, and support that
 “ excitement till the period of accession is
 “ over.” After mentioning several medicines
 which possess that power, he speaks of opium
 as one of the most effectual for that purpose.
 Doctor Lind says, that he has seen the happi-
 est effects follow the use of opium in fevers ;
 for, instead of the burning sensation which
 affects patients labouring under the hot stage,
 it induces sweat, accompanied by an agree-
 able softness of the skin. Doctor Odier, in a
 letter to Doctor Duncan, in the sixth volume
 of the Medical Commentaries, gives him the
 following account of the use of opium. “ We
 “ have repeated the experiments of Doctor
 “ Lind on opium, in intermittent fevers, al-
 “ ways with the greatest success. We use
 “ liquid laudanum, as he does, to the extent
 “ of twenty-five drops, after the beginning of
 “ the hot fit, and we find it shortens it much.
 “ It makes even a return of the paroxysm
 “ more regular, and has, in many instances,
 “ been alone sufficient to cure it altogether.
 “ We have given opium in cases where it is
 “ prohibited

“ prohibited by Doctor Lind, and with equal
 “ success; I mean those in which there is
 “ much delirium, which we have never found
 “ to be increased by it, but much oftener re-
 “ moved, and always diminished.”

IN support of the stimulant effects of opium in fevers, I shall here insert an extract from Doctor Rush's Lectures, delivered in the year 1791, in the college of Philadelphia. “ The
 “ use of opium in the low stage of a typhus fe-
 “ ver, is not to me a new remedy. I have used
 “ it in such cases many years, and have re-
 “ commended it, in my Lectures, in all those
 “ fevers, or stages of fevers, where wine was
 “ safe or proper. I observed the happiest ef-
 “ fects from it in the fevers of the military
 “ hospitals of the United States, during the
 “ late war.—In the year 1779, soon after I
 “ left the hospitals, I had a patient in the low-
 “ est stage of a typhus fever. At that time,
 “ opium was but little used in fevers in this
 “ city, and the dread of it, in these diseases,
 “ was almost universal. I had witnessed its
 “ safety and efficacy in many similar cases in
 “ the

“ the army, and therefore gave a pill, consist-
 “ ing of three grains of opium, to a pupil * in
 “ whose integrity I had great confidence, and
 “ desired him to administer it with *his own*
 “ *hands*—adding, at the time I gave it to him,
 “ that the death of our patient appeared to be
 “ certain without it, and that it was the only
 “ medicine, that I knew, that gave him any
 “ chance of recovery ; for he had previously
 “ taken large quantities of wine, vol. alk. bark,
 “ and moderate doses of laudanum, to no
 “ purpose. My requests were faithfully ex-
 “ ecuted, and my success was equal to my
 “ wishes. The opium removed the tremors
 “ and delirium of my patient, raised his pulse,
 “ produced general sweats, and from that time
 “ he gradually recovered.”

IF we examine the whole catalogue of in-
 flammatory diseases, we shall scarcely find
 one in which opium is recommended while
 the pure inflammatory diathesis prevails. If
 opium is so powerfully sedative, why is it not
 equally powerful in diminishing excess of ir-
 regular

* “ Doctor John Rogers—now of New-York.”

regular action (or, what is called by Doctor Cullen, “ phlogistic diathesis”), and in restoring health—which consists in an equilibrium between excitability and excitement, and which can only be effected by means of sedative powers? In pulmonic affections, attended with a cough, it is true, opium is sometimes given with advantage, before the inflammatory diathesis is removed; but, it is only because more undue action is communicated to the whole system by a constant and painful cough, than by moderate doses of this medicine.

I SHALL now mention the usual effects of opium on the human body.

1st. IN'EASING PAIN.—It produces this effect only when pain is accompanied by debility. In inflammatory diseases, and in all diseases of too much action of the system, it evidently increases pain, except it be given in doses sufficiently large to produce indirect debility.

2dly.

2dly. IN PRODUCING SLEEP.—Its effects in inducing sleep, are the same as those by which it eases pain, merely as a stimulant. The whole class of exciting powers, as the stimulus of food, drink, certain passions of the mind, &c. all operating within certain boundaries, give a disposition to sleep, that is, when their stimulus does not extend beyond a certain point. The sleep produced in this way is the most salutary. That opium produces sleep by its stimulant effects, is evident from that wakefulness which accompanies those asthenic diseases which reduce the system below the sleeping point. It is in such cases only, that opium should be used to induce sleep. Doctor Young justly observes, that “opium will not always make us sleep, “even when there is no apparent cause to “disturb us.” Doctor Mead likewise says, that “those who take it are so transported “that they *do not a'ways sleep*, yet there is “no happiness in the world can surpass the “charms of this agreeable extasy.”

3dly.

3dly. UPON THE STOMACH.—Impressions made on this important viscus, are soon communicated to the several parts of the body. The more excitability that has been given to any particular part, from the beginning of the living state, the more easily is it acted on by the exciting powers, whether they act with full force or not. Hence, opium operates with a force in the stomach, which it does not exert in any other part of the system.

4thly. UPON THE PULSE.—That opium increases the action and frequency of the pulse, in its first operation, appears from many experiments, several of which I have made upon my own body. The pulse, however, soon fails in frequency, and becomes full and hard. The same appears to have been the issue of many unequivocal experiments which were made by Doctor Leigh. This change, in my opinion, does not invalidate the theory which I have proposed; for, an acceleration of the pulse is not a constant concomitant effect of the action of stimuli on the system. As a proof of this, we need only at-

tend to that class of diseases which are induced by the action of exciting powers. Is not the pulse, in these cases, hard, full, and strong? On the other hand, the pulse, when under the influence of sedative powers, is weak, soft, and quick; which is diametrically opposite to the effects of stimulants.

5thly. UPON THE KIDNEYS.—It has been said, that opium diminishes every secretion, except that of sweat. This assertion, I conceive, is founded more on theory than observation, as will appear from the following facts.—Doctor Leigh's experiments prove, that opium, when taken in large quantities, increases the discharge of urine.—Doctor Michaelis, in the Medical Communications, says, he has seen the secretion of urine so plentifully increased by taking large quantities of opium, that the quantity of urine exceeded that of all the fluids they had drank.—Mr. Vitet, on Animal Medicine, observes, that “ opium, instead of
“ stupefying, causing sleep, exciting perspiration, and rendering the part to which it is
“ applied less sensible—increases the appetite
and

“ and vigour of the horse, ox, and sheep, and
 “ promotes the discharge of urine, particular-
 “ ly in the last of these animals.”

6thly. IN PROMOTING SWEAT.—Doctor Cullen, in treating on opium, under the head of Diaphoretics, observes, that “ the stimulant
 “ and sedative qualities of opium operate at
 “ one and the same time ; and in no instance
 “ more remarkably than in that of opium’s
 “ proving powerfully sudorific.” There is no occasion to call in the mixture of a sedative with a stimulating power. Opium, I apprehend, becomes a diaphoretic only in cases of debility ; and in such cases only Doctor Cullen has recommended it, in other parts of his works. Even in these cases, sweating is probably an accidental effect of the vigour imparted to the system by the use of opium, and not necessarily connected with the cure of the diseases of debility. Perhaps more benefit would arise from its use, if this vigour could be communicated to the system, without being accompanied by large and weakening discharges from the skin.

7thly. ON THE APPETITE.—The effects of opium cannot be better illustrated than by adverting to many experiments made by Mr. Vitet, and particularly to those which I before mentioned, when speaking of its effects on the kidneys. The following fact appears to throw great light on the subject.—In the late famine in China, in the year 1770, opium was purchased at an exorbitant price, by the unhappy sufferers, to allay the cravings of hunger. It not only promotes appetite, but, likewise, helps digestion. Of this, Doctor Rush informed us of a remarkable case, in his Lectures.—A medical gentleman who breakfasted with him, took a pill out of a box, which he carried in his pocket, and swallowed it just before he began to eat. On the Doctor's discovering some surprise at this act, the gentleman informed him, that he was troubled with dyspepsia, and that he was unable to digest a single meal unless he took before it a grain of opium.

I SHALL now, in a cursory manner, mention the diseases in which it is improper. They are
those

those which are denominated sthenic, as, the phrenitis, pleuritis, angina, peripneumonia vera and notha, hepatitis, &c.; or, such as are known by great heat, a redness of the eyes, florid countenance, pains in the back and loins, great thirst, high-coloured urine, with a tense, full, and hard pulse. It cannot fail to do harm so long as these symptoms of inflammatory action remain, which, says an ingenious author*, “ I have had the misfortune “ to learn from too-frequent experience.”

I SHALL now mention, in a few words, the efficacy of opium in a particular class of diseases; but shall not enumerate its effects on each disease belonging to that class, as this would carry me far beyond the bounds of an inaugural dissertation.

THE diseases in which it is proper, are those of debility, or those in which the excitement of the system is reduced below its healthy standard; as in most cases of spasm, dyspepsia, violent hysteria, hypochondriasis, dropsy, tetanus, and in fevers of the typhus-kind,

more

* Doctor Young, on Opium.

more especially when morbid wakefulness attends. It has lately become a very fashionable remedy for the venereal disease, and there have been a number of valuable communications published, by the different medical societies in Europe, respecting its efficacy in that disorder. A suspicion remains, that its virtues have been too highly rated: it may, however, be remarked, that many objections to it appear too precipitate. During my attendance upon the practice of the physicians of the Pennsylvania Hospital, I have seen it prescribed, and, I think, in some cases, with obvious advantage. Perhaps it acted only as a cordial and tonic; for, the cases in which it was given, were evidently accompanied with great debility, produced alike by the disease, and by previous unsuccessful discharges from the body by the use of mercury.

THE doses of opium should be accommodated to the degrees of action in the system; that is, beginning with small doses, and gradually increasing them, until the strength of the system can be supported by the customary and
 natural

natural stimuli. In the administration of opium, and while the body is under its influence, we should attend to the *pulse*, which has been justly called the DIAL-PLATE of the system in diseases; for, I conceive it to be as necessary to be governed by its degrees of action in the exhibition of opium, as it is in prescribing bleeding in inflammatory diseases.

FOR the pharmacy of opium, I must refer to the New Dispensatory, which comprehends the most eligible modes both of preparing and administering it. I shall only remark, that the extractum Thebaicum, which is so highly recommended in the London Dispensatory, as containing the purest opium, is proved, by the experiments of Doctor Leigh, not to possess the advantages that have been ascribed to it. He thinks it advisable to throw aside the formula of the London Dispensatory, and adopt the one recommended by him in Experiment XXIII*. as being effectual in freeing the
 opium

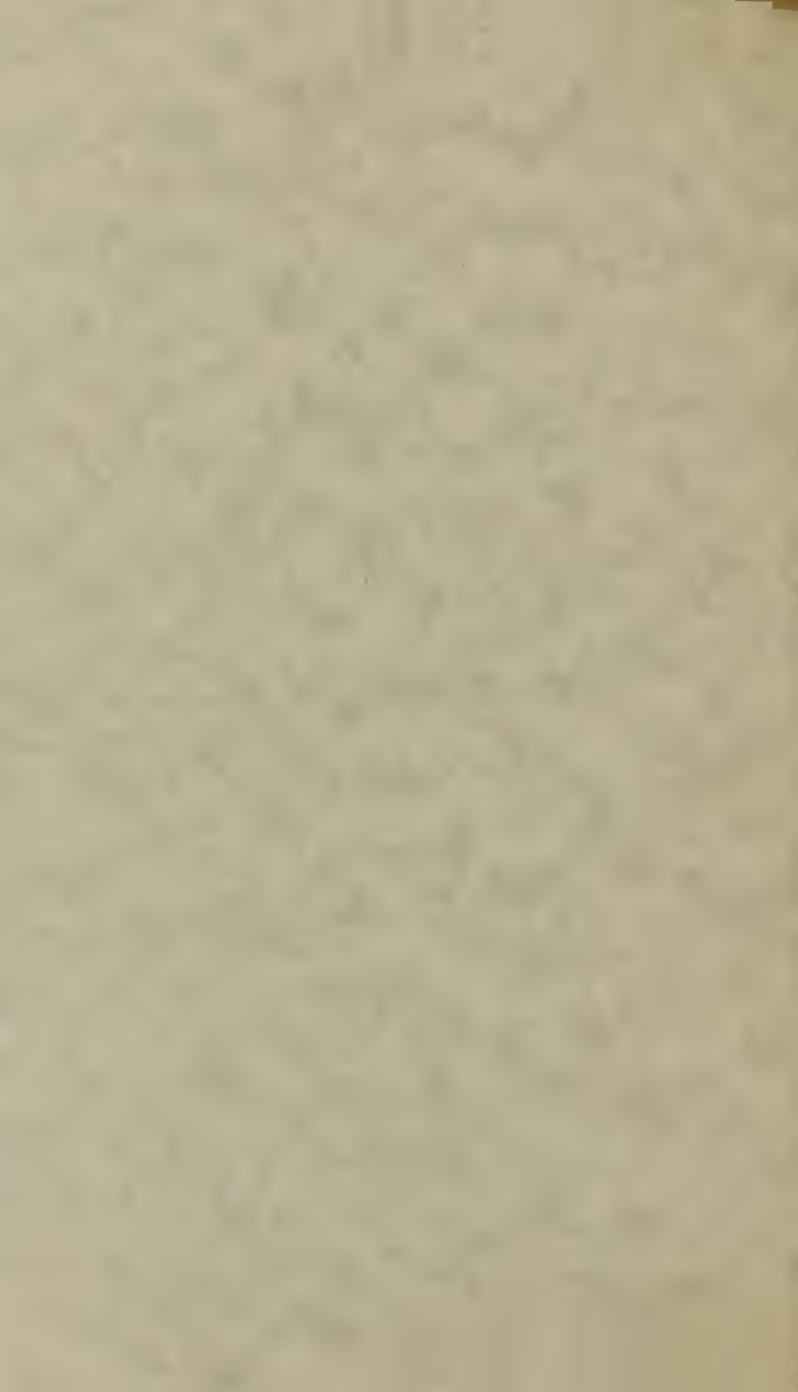
* “ To one ounce of the common opium of the shops add six ounces of spirits of wine, diluted with as much water; let them digest in a gentle heat for four days, during which time they

opium from its impurities, at the same time that we avoid injuring the active properties of the medicine.

TO you, worthy Professors of the College of Philadelphia, under whose kind auspices I have been guided, through my studies, to the conclusion of a medical education, I beg leave to return my most grateful acknowledgments. In bidding you adieu, I feel, for each of you, the same respect and affection, mingled with my gratitude, which a dutiful son feels upon parting with an affectionate parent. May you continue to exert your utmost efforts to promote the interests of medicine ; and may you enjoy, for many-many years to come, those blessings and comforts which flow from a well-spent and useful life !

they should be frequently agitated ; then filter the whole and evaporate the tincture, by a very gentle heat, down to the consistence of an extract."





Med. Hist.

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